

What is claimed is:

1. A method of detecting an abnormal pattern candidate, in which a microcalcification pattern candidate embedded in an object image is detected as an abnormal pattern candidate and in accordance with image information representing the object image, the method comprising the steps of:

i) performing processing, in which a first shape-dependent filter in accordance with a shape of a microcalcification pattern is utilized, on the object image, a fine structure image, which illustrates a fine structure area embedded in the object image, being thereby formed,

ii) performing enhancement processing, in which a second shape-dependent filter in accordance with the shape of the microcalcification pattern is utilized, on the fine structure image, an enhancement-processed image, in which the microcalcification pattern has been enhanced, being thereby formed, and

iii) detecting the microcalcification pattern candidate by use of the enhancement-processed image.

2. A method as defined in Claim 1 wherein a plurality of second shape-dependent filters, which conform to different image recording conditions at the time of object image acquisition, are prepared for the respective image recording conditions,

a second shape-dependent filter, which conforms to the image recording conditions of the object image to be processed, is selected from the plurality of the second shape-dependent

filters having been prepared, and

the enhancement processing is performed by use of the thus selected second shape-dependent filter.

3. A method as defined in Claim 1 wherein a plurality of second shape-dependent filters, which conform to different read-out conditions at the time of object image acquisition, are prepared for the respective read-out conditions,

a second shape-dependent filter, which conforms to the read-out conditions of the object image to be processed, is selected from the plurality of the second shape-dependent filters having been prepared, and

the enhancement processing is performed by use of the thus selected second shape-dependent filter.

4. A method as defined in Claim 1 wherein a plurality of second shape-dependent filters, which conform to different contrasts of microcalcification patterns embedded in object images, are prepared for the respective contrasts,

a second shape-dependent filter, which conforms to the contrast of the microcalcification pattern embedded in the object image to be processed, is selected from the plurality of the second shape-dependent filters having been prepared, and

the enhancement processing is performed by use of the thus selected second shape-dependent filter.

5. A method as defined in Claim 1 wherein a plurality of second shape-dependent filters, which conform to different sizes of microcalcification patterns embedded in object images,

are prepared for the respective sizes,

a second shape-dependent filter, which conforms to the size of the microcalcification pattern embedded in the object image to be processed, is selected from the plurality of the second shape-dependent filters having been prepared, and

the enhancement processing is performed by use of the thus selected second shape-dependent filter.

6. A method as defined in Claim 1 wherein a plurality of second shape-dependent filters, which conform to different combinations of image recording conditions at the time of object image acquisition, read-out conditions at the time of object image acquisition, contrasts of microcalcification patterns embedded in object images, and sizes of microcalcification patterns embedded in object images, are prepared for the respective combinations,

a second shape-dependent filter, which conforms to the combination with respect to the object image to be processed, is selected from the plurality of the second shape-dependent filters having been prepared, and

the enhancement processing is performed by use of the thus selected second shape-dependent filter.

7. A method as defined in Claim 1, 2, 3, 4, 5, or 6 wherein the first shape-dependent filter is a morphological filter.

8. An apparatus for detecting an abnormal pattern candidate, in which a microcalcification pattern candidate

embedded in an object image is detected as an abnormal pattern candidate and in accordance with image information representing the object image, the apparatus comprising:

5 i) fine structure image forming means for performing processing, in which a first shape-dependent filter in accordance with a shape of a microcalcification pattern is utilized, on the object image, in order to form a fine structure image, which illustrates a fine structure area embedded in the object image,

10 ii) enhancement-processed image forming means for performing enhancement processing, in which a second shape-dependent filter in accordance with the shape of the microcalcification pattern is utilized, on the fine structure image having been formed, in order to form an enhancement-processed image, in which the microcalcification pattern has been enhanced, and

15 iii) detection means for detecting the microcalcification pattern candidate by use of the enhancement-processed image having been formed.

20 9. An apparatus as defined in Claim 8 wherein the enhancement-processed image forming means operates such that:

a plurality of second shape-dependent filters, which conform to different image recording conditions at the time of object image acquisition, are prepared for the respective image recording conditions,

25 a second shape-dependent filter, which conforms to the image recording conditions of the object image to be processed,

is selected from the plurality of the second shape-dependent filters having been prepared, and

the enhancement processing is performed by use of the thus selected second shape-dependent filter.

5 10. An apparatus as defined in Claim 8 wherein the enhancement-processed image forming means operates such that:

a plurality of second shape-dependent filters, which conform to different read-out conditions at the time of object image acquisition, are prepared for the respective read-out conditions,

a second shape-dependent filter, which conforms to the read-out conditions of the object image to be processed, is selected from the plurality of the second shape-dependent filters having been prepared, and

the enhancement processing is performed by use of the thus selected second shape-dependent filter.

11. An apparatus as defined in Claim 8 wherein the enhancement-processed image forming means operates such that:

10 a plurality of second shape-dependent filters, which conform to different contrasts of microcalcification patterns embedded in object images, are prepared for the respective contrasts,

20 a second shape-dependent filter, which conforms to the contrast of the microcalcification pattern embedded in the object image to be processed, is selected from the plurality of the second shape-dependent filters having been prepared, and

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the enhancement processing is performed by use of the thus selected second shape-dependent filter.

12. An apparatus as defined in Claim 8 wherein the enhancement-processed image forming means operates such that:

5 a plurality of second shape-dependent filters, which conform to different sizes of microcalcification patterns embedded in object images, are prepared for the respective sizes,

a second shape-dependent filter, which conforms to the size of the microcalcification pattern embedded in the object image to be processed, is selected from the plurality of the second shape-dependent filters having been prepared, and

the enhancement processing is performed by use of the thus selected second shape-dependent filter.

13. An apparatus as defined in Claim 8 wherein the enhancement-processed image forming means operates such that:

15 a plurality of second shape-dependent filters, which conform to different combinations of image recording conditions at the time of object image acquisition, read-out conditions at the time of object image acquisition, contrasts of microcalcification patterns embedded in object images, and sizes of microcalcification patterns embedded in object images, are prepared for the respective combinations,

20 a second shape-dependent filter, which conforms to the combination with respect to the object image to be processed, is selected from the plurality of the second shape-dependent filters having been prepared, and

the enhancement processing is performed by use of the
thus selected second shape-dependent filter.

14. An apparatus as defined in Claim 8, 9, 10, 11,
12, or 13 wherein the fine structure image forming means utilizes
a morphological filter as the first shape-dependent filter.

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